

**AMENDMENTS**  
**In the Claims**

**Current Status of Claims**

1      1.(**currently amended**)      A method of improving coronary calcium imaging-based cardiac risk  
2      assessment comprising:  
3            a.      scanning a region of interest in a patient using computed tomography (CT);  
4            b.      storing CT generated data resulting from ~~said~~ the scanning, the data comprising  
5            ~~calcification data as~~ CT generated images;  
6            c.      analyzing the CT generated images to determine a location, ~~heterogeneity~~, shape,  
7            size, ~~texture~~; and density ~~gradient~~ of each calcified spot in a patient's heart;  
8            d.      analyzing the CT generated images to determine a ~~scatterness~~ distribution and a  
9            pattern of the ~~multiple~~ calcified spots;  
10          e.      defining a risk score based on the analyzing step c and/or the analyzing step d; and  
11          f.      assessing a patient's risk of cardiovascular disease based upon the risk score.

2.(**cancelled**)

3.(**cancelled**)

4.(**cancelled**)

5.(**cancelled**)

6.(**cancelled**)

7.(**cancelled**)

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9.(**cancelled**)

10.(**cancelled**)

11.(**cancelled**)

12.(**cancelled**)

13.(**cancelled**)

14.(**cancelled**)

15.(**cancelled**)

16.(**cancelled**)

17.(**cancelled**)

18.(**cancelled**)

19.(**cancelled**)

20.(**cancelled**)

21.(**cancelled**)

22.(**cancelled**)

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25.(**cancelled**)

26.(**cancelled**)

27.(**cancelled**)

28.(**cancelled**)

29.(**cancelled**)

30.(**cancelled**)

31.(**cancelled**)

32.(**cancelled**)

33.(**cancelled**)

34.(**cancelled**)

35.(previously presented) The method of claim 1, further comprising  
g. categorizing an area of an abrupt change in regional coronary elasticity as a high-risk region.

36.(currently amended) The method of claim 1, further comprising:  
determining wherein each location comprises a distance from a base or apex of the patient's heart and proximal or distal artery calcification segment of coronary arteries.

**37.(currently amended)** The method of claim 1, wherein the first analyzing step further determines a change in density of each calcified spot from the CT generated images wherein each heterogeneity comprises variance in calcium densities with its spot.

38.(currently amended) The method of claim 1, wherein each shape comprises a ~~circular or angular spot having concentric or eccentric character.~~

**39.(currently amended)** The method of claim †37, further comprising:  
relating differing density of each calcified stop to an area of abrupt change in a regional coronary elasticity wherein each texture comprises a smooth or rough texture.

40.(canceled)

41.(currently amended) The method of claim 1, further comprising:  
determining a distribution of calcification in multiple coronary arteries wherein the  
scattersness comprise interspot distance and the pattern comprises variance of calcium densities  
among two or more spots.

**42.(previously presented)** The methods of claim 1, wherein the CT generated images are generated by electron beam computed tomography (EBCT) or multi-detector spiral CT (MDCT).

**#243.(previously presented)** The methods of claim 1, wherein the analyzing steps utilizes statistical determinants including mean, median, mode, standard deviation, range, coefficient of variation, skew, or kurtosis, or a combination thereof.

**4344.(currently amended)** A method for improving coronary calcium imaging-based cardiac risk assessment comprising:

3       a. scanning a region of interest plurality of sections of coronary arteries in a patient  
4       using computed tomography (CT) at a first time;  
5       b. storing first CT generated data resulting from the first scanning, the data comprising  
6       calcification data as first CT generated images;  
7       c. later scanning a region of interest in a patient the plurality of sections of the coronary  
8       arteries in the patient using the computed tomography (CT) at at least one later a  
9       second time;  
10      d. storing later second CT generated data resulting from the later second scanning, the  
11       data comprising calcification data as later second CT generated images;  
12      e. analyzing the two or more sets of first and second CT generated images of a patient  
13       obtained at the two or more times to determine changes in a location, a heterogeneity,  
14       a shape, a size, a texture, and a density and a change in density gradient of each  
15       calcified spot in the patient's heart coronary arteries at the two times;  
16      d forming first and second maps of the plurality of sections of the coronary arteries as  
17       a function of the statistical distribution of the shape, the size, the density and the  
18       change in density of the calcified spots in each of the sections of the first and second  
19       CT generated images;  
20      e. analyzing the two or more sets of CT generated images of the patient obtained at the  
21       two or more time points to determine changes in a scatterness and a pattern of  
22       multiple calcified spots using the maps to determine a progression of plaque;  
23      f. defining a risk score based the analyzing step e c, the forming step d and/or the  
24       analyzing using step f; and  
25      g. assessing a patient's risk of cardiovascular disease based upon the risk score.

1       **445.(currently amended)** The method of claim 43, further comprising  
2       e. using the changes in calcification density of the calcified spots, heterogeneity, shape,  
3       size, texture, and density gradient to assess the patient's risk of cardiovascular  
4       disease by relating the changes in density of the calcified spots to an outcome of a  
5       lesion.

1       **46.(previously presented)** The methods of claim 43, wherein the analyzing steps utilizes  
2       statistical determinants including mean, median, mode, standard deviation, range, coefficient of  
3       variation, skew, or kurtosis, or a combination thereof.

1       **47.(previously presented)** The method of claim 43, further comprising:  
2       determining wherein each location comprises a distance from a base or apex of the patient's

3 heart and proximal or and distal artery calcification segment of coronary arteries

1 48.(canceled)

1 49.(currently amended) The method of claim 43, wherein each shape comprises a circular or  
2 angular spot having concentric or eccentric character.

1 50.(previously presented) The method of claim 43, further comprising:  
2 relating a differing density of each calcified spot to an area of abrupt change in a regional  
3 coronary elasticity wherein each texture comprises a smooth or rough texture.

1 51.(canceled)

1 52.(previously presented) The method of claim 43, further comprising:  
2 determining a distribution of calcification in multiple coronary arteries wherein the  
3 scatterness comprise interspot distance and the pattern comprises variance of calcium densities  
4 among two or more spots.

1 53.(previously presented) A method of mapping comprising:  
2 forming a map of a plurality of sections of coronary vessels as a function of the statistical  
3 distribution of heterogeneity, shape, size, texture, and density and changes of density gradient of  
4 calcified spots in each sections, where the map is used to determine a progression of plaque and to  
5 categorize a patient's risk of cardiovascular disease.